

SECOND PRELIMINARY AMENDMENT

Serial Number: 10/796,526

Filing Date: March 9, 2004

Title: AUTOMATIC TURN-ON AND TURN-OFF CONTROL FOR BATTERY POWERED HEADSETS

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IN THE CLAIMS

Please amend the claims as follows:

- 1-8. (Canceled)
9. (Currently Amended) ~~An active headset~~ Apparatus having at least two operating states and comprising:
one or more earcups;
means for sensing ~~a condition that is within at least one of the earcups~~ acoustic energy based on user movement; and
means, responsive to a perceived absence of the ~~condition~~ acoustic energy, for ~~changing the operating state of the headset~~ switching between the operating states.
10. (Currently Amended) The ~~active headset~~ apparatus of claim 9 wherein the ~~condition~~ acoustic energy is inaudible.
11. (Canceled)
12. (Currently Amended) The ~~active headset~~ apparatus of claim 9 wherein one of the two operating states is an on state and the other is an off or standby state, and wherein the means for ~~changing the operating state of the headset~~ switching is responsive to the sensed condition to ~~change~~ switch from the on state to the off or standby state.
13. (Canceled)
14. (Canceled)

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15. (Currently Amended) ~~An active headset~~ Apparatus having at least two operating states and comprising:
one or more earcups;
~~means~~ circuitry for sensing a condition based on user jaw movements or blood movement within a user's head; and
~~means~~ circuitry for changing the operating state of the headset from an on state to an off state in response to a perceived absence of the condition.
16. (Currently Amended) The ~~headset~~ apparatus of claim 15 wherein the predetermined period of time is at least one minute and the circuitry for changing comprises analog circuitry.
- 17-20. (Canceled)
21. (Currently Amended) ~~Apparatus An ANR headset having at least an active operating state and an inactive or standby operating state and comprising:~~
one or more earcups;
an ~~ANR~~ microphone for sensing ~~a condition based on~~ acoustic energy produced by user movement ~~user jaw movements or blood movement within the user's head;~~
a timer ~~circuit for measuring duration of a perceived absence of the condition; for~~ determining whether the acoustic energy is absent for at least a predetermined amount of time; and
a switch ~~coupled responsive to the timer circuit for switching the ANR headset from one of the active and inactive operating states to the other of the active and inactive operating states~~ ANR circuitry from an active state to an inactive state.
22. (Currently Amended) The ~~ANR headset~~ apparatus of claim 21, wherein the timer ~~circuit~~ comprises:
a threshold detector; and

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a microprocessor coupled to the threshold detector and to the switch.

23. (Currently Amended) The ~~ANR headset~~ apparatus of claim 21, wherein the predetermined amount of time is at least one minute.
24. (Currently Amended) A method of operating an ~~ANR headset~~ apparatus including an audio transducer and ANR circuitry attached to an earcup for engaging the ear of a user, the method comprising:
~~sensing a condition~~ determining whether acoustic energy produced by the user has been sensed by the audio transducer; and
switching at least a portion of ~~the ANR headset~~ the ANR circuitry from an active state to an inactive or standby state in response to a determination that the acoustic energy has not been sensed a perceived absence of the condition for at least a predetermined amount of time.
25. (Currently Amended) The method of claim 24, wherein ~~switching at least the portion of the ANR headset comprises switching in response to sensing an absence of certain frequency content from the output of an audio transducer within the cavity for an the acoustic energy is inaudible and the predetermined amount of time of at least is at least~~ one minute.
26. (Currently Amended) The method of claim 24, wherein the ~~ANR headset~~ apparatus includes an ANR driver ~~within the cavity and ANR circuitry coupled to the ANR driver;~~ and wherein the method further comprises switching the ANR circuitry from the inactive state to the active state in response to sensing deflection of a portion of the ANR driver.
27. (Currently amended) The method of claim 24, ~~wherein the certain frequency content is no greater than five Hertz~~ wherein the acoustic energy is produced by user blood flow.

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28. (Currently Amended) The method of ~~claim 27~~ claim 24, wherein switching at least a portion of the ANR headset from an active state to an inactive state in response to a perceived absence of the condition comprises:
starting a timer in response to sensing the condition, with the timer configured to expire after measuring the predetermined amount of time; and
switching at least the portion of the ANR headset from the active state to the inactive state in response to expiration of the timer.
- 29-34. (Canceled)
35. (Currently Amended) ~~An ANR headset~~ Apparatus comprising:
at least one audio transducer for placement adjacent an ear of a user;
a bandpass filter, responsive to operation of the one audio transducer, circuitry for sensing to provide an a low-frequency electrical signal having a frequency no greater than five Hertz output that is indicative of a user wearing at least a portion of the apparatus;
and
~~circuitry responsive to a perceived absence of the low-frequency electrical signal to reduce power usage of the headset~~
a switch responsive to a perceived absence of the output that is indicative of the user wearing at least a portion of the apparatus for switching ANR circuitry from an active state to an inactive state.
36. (Currently Amended) The ~~ANR headset~~ apparatus of claim 35, ~~wherein the circuitry for sensing a low-frequency electrical signal comprises:~~ further comprising:
~~a bandpass filter; and~~
a threshold detector operatively coupled between ~~coupled to~~ the bandpass filter and the switch.

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37. (Currently Amended) The ~~ANR headset apparatus~~ of claim 35, wherein the ~~circuitry responsive to a perceived absence of the low frequency electrical signal, to reduce power usage of the headset, comprises:~~

~~means, responsive to the perceived absence of the low frequency electrical signal, for reducing power usage of the headset;~~

switches the ANR circuitry from the active state to the inactive state in response to a perceived absence of the output for a predetermined time of at least one minute and wherein the bandpass filter comprises analog circuitry.

38-40. (Canceled)

41. (New) Apparatus comprising:

a bandpass filter responsive to operation of a microphone to provide a first output based on

acoustic energy produced by a user of the apparatus; and

a switch responsive to the first output to switch ANR circuitry from an active operating state to an inactive operating state.

42. (New) The apparatus of claim 41, further comprising a threshold detector responsive to the first output of the bandpass filter to provide a second output, wherein the switch is responsive to the second output.

43. (New) The apparatus of claim 41, further comprising a timer responsive to the first output to control operation of the switch.

44. (New) The apparatus of claim 41, wherein the timer comprises programmable means for outputting a control signal to the switch after passage of a predetermined amount of time.

45. (New) The apparatus of claim 41, wherein the bandpass filter comprises analog circuitry that defines a passband of 1-5 Hertz.

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46. (New) The apparatus of claim 41, wherein the acoustic energy produced by the user is based on blood flow.

47. (New) Apparatus comprising:
a filter responsive to operation of a microphone to provide a filter output based on acoustic energy produced by a user of the apparatus;
a threshold detector responsive to the filter output to provide a detector output;
a timer responsive to the detector output to start a timing period and responsive to completion of the timing period to produce a control signal; and
a switch responsive to the control signal to switch ANR circuitry from an active operating state to an inactive operating state.

48. (New) The apparatus of claim 47, wherein the filter output is based substantially on acoustic energy produced by a user of the apparatus when the user is wearing at least a portion of the apparatus.

49. (New) The apparatus of claim 47, wherein the filter comprises analog circuitry that defines a passband of 1-5 Hertz; the threshold detector comprises analog circuitry; the timer comprises a processor; and the switch comprises a transistor.

50. (New) The apparatus of claim 47, wherein the acoustic energy produced by the user is based on blood flow.

51. (New) Apparatus comprising:
a switch for switching ANR circuitry from an active operating state to an inactive operating state;
and
a timer, responsive to disengagement of at least a portion of the apparatus with or from a user, for

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controlling status of the switch.

52. (New) The apparatus of claim 51, wherein the timer comprises programmable means for outputting a control signal to the switch after passage of a predetermined amount of time.

53. (New) The apparatus of claim 51, further comprising:
a bandpass filter responsive to operation of an ANR microphone to provide an output based substantially on acoustic energy produced by the user.

54. (New) The apparatus of claim 53, wherein the bandpass filter has a passband of 1-5 Hertz.

55. (New) The apparatus of claim 53, wherein the acoustic energy produced by the user is based on blood flow.

56. (New) A method of operating ANR circuitry, comprising:
automatically determining whether acoustic signals produced by a user of the ANR circuitry are present within a cavity associated with the circuitry; and
automatically turning off the ANR circuitry in response to determining that the acoustic signals produced by the user are no longer present.

57. (New) The method of claim 56, wherein the acoustic signals produced by the user are based on user blood flow.

58. (New) The method of claim 56, wherein automatically determining whether acoustic signals produced by the user are present comprises:
producing a first output in response to operation of a microphone;
filtering the first output to produce a filtered output; and

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determining based on magnitude of the filtered output whether the acoustic signals produced by the user are present.

59. (New) The method of claim 51, wherein automatically turning off the ANR circuitry in response to determining that the acoustic signals are no longer present, comprises: initiating a time measurement in response to an affirmative determination that acoustic signals produced by the user are present; and turning off the ANR circuitry in response to the time measurement indicating passage of at least a predetermined amount of time.

60. (New) The method of claim 56, wherein the cavity is at least partly defined by an earcup.